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The prospects of using chaotically reinforced organoplastics based on phenylone in mechanical engineering

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Recent years are characterized by a rapid growth in the use of composite materials (CM) in various fields of technology. Among them, a special place is occupied by polymer CM reinforced with organic fibers - organoplastics (OP). Owing to fibers, OP, in comparison with glass and carbon fiber, have a number of qualities, both positive and negative: the features of mechanical behavior under load, interaction with the external environment. However, it is due to the peculiarity of the OP in aviation technology that certain problems are solved that can't be solved by other materials. Distinctive features of OP, as structural materials, are: low density (these are the lightest structural materials), high endurance under dynamic loading, high damping characteristics, resistance to impact and erosive influences.

The aim of this work has been to develop and study the properties of promising new heat-resistant self-reinforced organoplastic materials with Sulfone-T chemical discrete fibers. To obtain composite materials the container was charged with a powdery sample of phenylone and crushed fibers, ferromagnetic particles were added produced in the form of cylinders with a diameter of 2 mm and a length of 15 mm. The volume was placed into a rotary electromagnetic field (0.12-0.15 Tesla). The thus prepared mixture of the product was processed into the block ware by compression molding. Special emphasis during studying of its physical-mechanical properties got compression strength, because this factor allows to predict load-bearing capacity of friction knot completed with details from organic fiber-reinforced plastics.

According to the results of the studies, it was determined that the microhardness values differ slightly from the initial values, this indicates the consolidation of the polymer and fiber, some decrease indicates the formation of pores at the polymer-fiber interface, when a larger number of fillers is introduced. The same character of the change is observed when comparing the additive and hydrostatic densities. All the elastic characteristics of the obtained OP exceed the base polymer, namely, according to the Young's modulus, shear modulus and bulk elasticity of 1.48; 1.41 and 1.87 times, respectively, Poisson's ratio and Lame parameter in 1.3 and 2.3 times.

It was found that the developed OP based on phenylone have the required properties in mechanical engineering: low density and high strength characteristics.